

## Claims

1. Method for determining the causes of failures in industrial processes, in particular continuous processes with continuous webs,  
characterized in that
  - process variables (P1 ... P10) and the time and/or location of a failure are detected and
  - correlations are determined between the detected process variables and the time and/or location of a failure.
2. Method according to claim 1, characterized in that those process variables (P1 ... P10) exhibiting no significant correlation with the failure are excluded as the cause of the failure.
3. Method according to claim 1 and/or 2, characterized in that those process variables (P1 ... P10) for which the established correlation is a consequential effect rather than a cause are excluded as the cause.
4. Method according to one of the preceding claims, characterized in that detailed analyses are carried out for the sub-processes with process variables (P1 ... P10) with significant correlation with the failure.
5. Method according to one of the preceding claims, characterized in that measures are worked out to eliminate the causes of the failures.
6. Method according to claim 5, characterized in that the measures are evaluated technically

and economically.

7. Method according to claim 1,  
characterized in that a sub-process of the industrial process  
5 exhibiting the failure is determined, at whose physical  
interfaces with the remainder of the process there is no  
significant correlation with the failure.

8. Method according to claim 7,  
10 characterized in that only process variables from the sub-  
process are detected for cause determination purposes.

9. Method according to claim 1,  
characterized in that time correlations are used to determine  
15 technical failures.

10. Method according claim 1,  
characterized in that location correlations are used to  
determine technological failures.

20 11. Method according to one of the preceding claims,  
characterized in that the failures are sporadic failures in a  
continuous production process.

25 12. Method according to one of the preceding claims,  
characterized in that the failures are web breaks.

13. Method according to one of the preceding claims,  
characterized in that it is implemented by a service provider.

30 14. Device (2) for determining causes of failures in  
industrial processes, in particular continuous processes with  
continuous webs,

characterized by

- a detection unit (3) for detecting process variables (P1 ... P10) and the time and/or location of a failure,
- an evaluation unit (4) for determining correlations between  
5 the detected process variables (P1 ... P10) and the time and/or location of the failure,
- an output unit (5) for outputting the process variables (P1 ... P10) correlating with the time and/or location of the failure.

10 15. Device according to claim 14,

characterized in that the detection unit has:

- a) at least one measuring bus system (B1 ... B2) that is not identical to a bus system or plurality of bus systems of an automation unit for controlling and/or regulating the  
15 industrial process,
- b) at least one measuring head (M1 ... M6) for detecting measuring signals, which is connected on the input side to signal sources (S1 ... S6) of the industrial process that are already present and/or to be provided additionally and on the  
20 output side forwards signals in a predefined form to the measuring bus system (B1 ... B2) and
- c) one or a plurality of data concentrators (D1 ... D2), which are connected to the measuring bus system (B1 ... B2).

25 16. Device according to claim 15,

characterized in that at least one measuring head (M7) is provided, which is connected on the input side to any bus system (P2).

30 17. Device according to claim 15 or 16,

characterized in that at least one measuring head is provided, which is connected on the output side directly to a data

concentrator (D1 ... D2).

18. Device according to one of claims 15 to 17,  
characterized in that means are provided to identify measuring  
5 heads (M1 ... M7) and/or data concentrators (D1 ... D2)  
automatically.

19. Device according to one of claims 15 to 18,  
characterized in that a communication unit is provided, which  
10 allows the automatic setting up of communication between data  
concentrators (D1 ... D2) and measuring heads (M1 ... M7).

20. Device according to one of claims 15 to 19,  
characterized in that the measuring signals can be time-  
15 stamped.

21. Device according to one of claims 15 to 20,  
characterized in that at least one measuring head (M1 ... M7) is  
provided, which is connected to a signal source supplying a  
20 standard time signal.

22. Device according to one of claims 15 to 21,  
characterized in that the data concentrators (D1 ... D2) can be  
extended such that the number of measuring bus systems (B1 ...  
25 B2) and/or measuring heads (M1 ... M7) required in each instance  
can be connected thereto.